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Why Some Messages Speak Better: Child Immunization in the News and on the Internet

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Abstract

Modern health protection generally affords vaccination against infectious diseases along with other environmental health threats. However, with the increase both in development of new vaccines and in making more and more vaccines available to the general public comes an increase in health scares, mainly in media. In the wake of health scares, we often find government and health organizations launching campaigns to restore faith in current vaccine policies. But health scares are hard to quell and seem to have messages that "speak better" to those unconvinced about the safety of vaccines. This paper seeks to review recent studies on the health messages prevalent in various news outlets and on the internet. Equal focus has been given to messages originating from government and health organizations as well as those that stem from lay organizations, such as parent communities and anti-vaccination groups. Particular emphasis was placed on studies that did not simply look at the content of the message, but which explored the rhetoric of the message. This review revealed that there is a shortage of studies, and that a comprehensive study of health messages and communication outlets across a much wider range of vaccines is urgently warranted. Based on current research, lay-based/lay-oriented dissemination approaches seem to have a greater effect on lay perceptions of vaccines, and potentially parent behavior. In terms of content, these approaches rely heavily on parent stories around adverse effects, and in terms of rhetoric, the language used tend towards dread words.

Key Words
vaccine communication, health scares, media, parent stories, risk message, rhetoric

Introduction

Public health encompasses health protection and health improvement. In order to protect the health of the general public, infectious diseases along with a wide range of other environmental health threats need to be controlled or at least prevented. Since the invention of the first vaccine in the 18th century, immunization has proved one of the most effective means of protecting individuals and communities. Based on current research and expert advice, governments put in place national immunization programs that target vaccine preventable diseases in both children and adults. However, vaccines often carry some risk of adverse events, and consequently immunization policies also regulate when and how reported adverse effects should be made known to the public[1]. Up-to-date information about the risks of the diseases and the vaccines are continually disseminated to the general public by government as well as non-government organizations through various public health communication outlets.

Public health communication occurs on two levels: population communication and individual (face-to-face) communication. Both types of communication levels involve a variety of interacting networks, with lay networks forming the reoccurring basis of the communication. Individual communication also tends to include health professional networks, while population communication typically involves government networks and media networks. As it is usually the sending and receiving of scientific information that form the goal of either type of communication, other networks such as specialist research networks can also feature as key agents, either directly or indirectly. Thus, public health communication outlets include: television, radio, newspapers, health websites, online (parent) forums, GP and nurses appointments, leaflets, research articles and popular science products. As an independent transmitter, media publicizes information and views from a wide range of sources, usually in an effort to be seen as objective[2]. In recent years, the internet has become another important public health communication outlet, possibly due to it being open to all sources and allowing both population and individual communication[3]. As media and the internet are highly popular transmitters of health advice to the general public, this paper will focus on these outlets.

Risk perception has been defined as "people's beliefs, attitudes, judgments and feelings, as well as the wider social or cultural values and dispositions that people adopt, towards hazards and their benefits"[4:89], or we can define it as "the personal belief that one can be potentially harmed"[5:319]. While experts and lay audiences commonly disagree on the magnitude of the risk, the ranking of risks are often mirrored between one group and another[6]. In fact, many misconceptions about vaccines commonly attributed to parents are prevalent among physicians as well[7]. It is generally agreed in risk communication literature that the general public understand new information or form new beliefs in relation to already known information or beliefs[8]. Studies using a range of methodologies, though most notably mental models which highlight the importance of the duality between new/expert and old/lay, have describe a vast number of factors influencing vaccine risk perception and ultimately decision making[7]. However, while these studies have focused exhaustively on the content of the health message, they generally do not comment on the potential effect that language and rhetoric can have. This paper specifically seeks to address this gap.

While understanding risk is the focus of many scientific studies, benefits are considerations that receive less attention. This situation is also mirrored in media reports involving some degree of risk assessments, such as immunization stories that tend to focus on the risk vaccine side effects, while ignoring the protection against a potentially debilitating disease. The literature on media and risk is mostly developed around the effects of media on risk perception[9]. Immunization studies have focused on media's impact on parents' beliefs, perception and decision making[10-12], or the general public's perception of immunization[13]. Some studies have targeted particular diseases and vaccines: swine flu[14], human papilloma virus (HPV) [15], diphtheria-tetanus-pertussis -polio-*haemophilus influenzae* type b[11], and measles-mumps-rubella (MMR)[16]. Knowledge about causality is likely to be important to parents[7]. A review of risk perception and the media revealed that media is specifically lacking in examination of cause and effect[17], something particularly noticeable in media and other lay discussions focusing on the temporal relation between vaccination and an adverse event that may or may not be related to the vaccination. Dramatic and frequent media reporting of low probability/high consequence events has been linked to greater perceived risk and anxiety[18]; for example, the risk of contracting Guillain-Barre syndrome is less than 1 per million, yet many fear the swine flu vaccine because of this risk even though the risk of complications from swine flu is greater. Commonly, vaccines are seen as riskier than the diseases[7]. While affecting public risk perception, media's ability to impact individual's health choices is debatable[19, 20]. Ramsay and colleagues[16] found that 92% of mothers would have their future children vaccinated despite adverse media coverage. However, they also found that only 67% believed that the vaccine was safe or low risk, showing an alarming discrepancy between risk perception and behavior. Clearly, there is still an urgent need to establish how to communicate vaccine safety to the general public.

Health messages

Messages are made up of mental representations (i.e. conceptualizations). It should be noted that the sender and receiver's mental representations are usually not exactly the same, although they need to sufficiently overlap or else the message will fall short. In public health communication, messages can fail for other reasons. Their purpose is not simply the exchange of information, but there is also an intention to make the receiver believe and trust the message and, where relevant, act upon the recommended health precaution. To this end, the receiver needs to assess the message, the probabilities of risk associated with complying with the advice versus not complying (which potentially could include searching for alternative actions), the relevance and applicability of the message, and the reliability and authority of the source. With regard to the latter point, indirectly communicated information (e.g. transmitted via media) also involves assessment of the transmitter. The mental representations of a message as well as information that will allow the receiver to assess the message, source and transmitter are conveyed through language[21]. A recent study of child immunization discourse between parents and nurses showed that nurses have developed skillful strategies that allow them to empower the parents while at the same time gently steer them towards a clinically desirable outcome[22]. The significance of studies of the language employed in health messages lies in their applicability.

Discourse analysis commonly differentiates between macro and micro analysis, with the latter looking at the linguistic details of the discourse. Population oriented studies have so far tended to take a macro approach detailing and contrasting discourse themes (e.g. through content analysis), while micro-analyses have mainly been used in

individual communication (e.g. using conversation analysis). Recent studies looking at immunization in the news have, for example, sought to establish the effect of "fright factors", such as threatening death in relation to the disease or specific danger to children due to adverse effects, on risk perception [23]. Abdelmutti and colleagues also counted the number of words with positive tone versus negative tone (so called "dread words"), but this purely quantitative approach to language was only able to discern no statistical difference in tone between US and Canadian news papers in their coverage of HPV. As a relatively new transmitter, there are fewer studies on immunization on the internet, yet a lot of information about vaccines and adverse effects are nowadays disseminated and debated online. Kata[24] did a content analysis of US and Canadian websites, focusing specifically on pro- versus anti-vaccination messages. Results also confirmed a few linguistic patterns for the anti-vaccination massages, notably avoidance of the term "immunization", which the author explains as being due to the belief that vaccines not necessarily confer immunity. In sum, aside from occasional studies that have included some linguistic analysis, research on vaccine risk communication in media or the internet has methodologically been limited to content analysis, regardless of which vaccine is in focus: swine flu[14], HPV[25], rotavirus[26] and MMR[27].

By establishing current practices and their impact in one setting, we can develop transferable communication strategies that allow communicators to tailor messages to specific audiences, and thereby achieve maximum impact. The potential effect of the language of the health message upon both risk perception and behavior is incredibly under-researched, and strikingly few studies have addressed the role of the message through micro analysis of vaccine discourse. This review will explore the use, impact and potential of immunization discourse in the news and on the internet, with particular emphasis on rhetorical devices and dread words. In order to be able to extract and synthesize knowledge from studies of media discourse and internet discourse, the mental representations and the key terminology used for these representations in the discourse need to be sufficiently similar; in other words, while some concepts and linguistic expressions occur across most immunization discourse, there are likely to be vaccine specific preferences as well. For this reason, and also due to the limited number of studies that have included language in their analysis, this review will look at discourse studies that specifically targeted the MMR vaccine. It could be argued that MMR debate is outdated; however, as the huge 2012-13 measles outbreak in Wales with over 1200 cases (www.wales.nhs.uk) and other recent outbreaks in e.g. Australia and the US show, the MMR debate still has a profound effect on children's health.

News

News coverage of vaccine preventable diseases and vaccines in the UK has increased dramatically in the late 1990's[28]. In these reports, we can see an even faster increase of the issue of vaccine safety. These increases correlate very closely with the MMR debate which ensued after the publication of Wakefield and colleagues'[29] paper on a hypothesized link between the MMR vaccine, inflammatory bowel disorder and autism in 1998. In a study of news articles published in 1998 and 1999 on the MMR debate, Rundblad and colleagues[21] looked specifically at language associated with authority and factuality, both of which are typical conceptual categories in health communication. Authority is the reader's assessment of the reliability of the source, while factuality is the reader's assessment of the evidence (with scientific discourse displaying less quantification and vagueness compared to lay/media discourse). The investigated articles were at the very core of the MMR debate in UK media, and both sides of the debate were amply represented. Similarly, Leask and

Chapman[30] looked at immunization in Australian newspapers, from 1993-1998. Much of their study focused on the language used in descriptions of the diseases and the allocation of blame (especially who was to blame for the low immunization uptake), and again the focus on authorities and facts stands out. In contrast to the balanced UK debate, the Australian coverage was visibly in favor of immunization. However in this context, it is essential to remember that journalists generally consider themselves neutral in their writing[2], while the sources they choose to quote do take a stance[31]. Consequently in media, it is the selection of referenced authorities, especially those that are quoted verbatim, that tint the discourse as pro- or anti-immunization. The MMR debate was equally for and against immunization in the UK news because there were two medical groups, i.e. two authoritative opponents. Following the 2010 hearing of Wakefield and two of his colleagues by the General Medical Council, which resulted in Wakefield and one colleague being struck off the medical register and *the Lancet* retracting the 1998 article[29] , UK media and health agencies have discussed that more responsible deliberation over inclusion of claims is needed in order to avoid another health scare.

Both the UK and Australian texts gave significant prominence to health professionals and the government. Parents were, on the other hand, noticeably underrepresented in the texts. The UK news articles featured almost twice as many direct citations at the onset of the MMR debate compared to one year later. The absolute majority of these quotes were from researchers and health officials. The choice to use direct citation for only one side of an issue tends to sway people's perception of the issue towards that side[32]. However, when one of the sides is the parents, this does not necessarily seem to hold true. Interestingly, the Australian newspapers included personal testimonies from parents whose children were severely ill with vaccine preventable diseases, whereas the UK texts chose parents whose children developed autism after having been immunized. By coupling word-for-word authenticity with the vividness usually displayed in personal testimonies, parents' stories become very influential. It is also important to note that more vivid exemplars (images or testimonies) are remembered longer and are associated with higher risk estimates[33]. In the UK, it was these personal testimonies from parents linking their child's autism to the MMR vaccine that made other parents query whether to immunize their children[34]. Similarly, we can postulate that the testimonies on the viciousness of childhood diseases by the Australian parents contributed to a pro-immunization effect, in addition to the authoritative health and government sources.

Consistently, parents were urged to have their children immunized. This was usually achieved through "stern directives"[30], which were commonly reiterated in the headlines. In UK media, the use of deontic expressions (e.g. *must, ought*) was significantly higher just after the Wakefield article was published[21]. In addition to urging parents to vaccinate, the high use of deontics also reflected parents/journalists querying the best course of action and asking for directives: "What *should* we do?" A few of the Australian headlines featured the word *plea*, a cry for parents to agree to immunization[35]. This striking word choice suggests desperation, and therefore, immediately undercuts the authority of the health authorities. In combination with criticism over lack of government coordination, a fair share of the blame for low immunization rates was bequeathed to the Australian government and health authorities. However, most of the blame for low vaccine uptake fell on parents[35]. On a similar note, some of the UK researchers quoted by media very subtly placed the responsibility of reassurance on the parents, using expressions such as *I do hope*[21]. When used in constructions such as "I do hope our results will be able to reassure parents", it carries a clear directive meaning, 'be reassured', even though it is strictly

speaking not a deontic. The success of this type of construction depends on the authority of the source, which needs to be considerable.

An interesting difference between the news coverage in both countries lies in references to children. Terms such as *children, infants* and *babies* are commonly classed as "dread words" in communication about potential health risks[36]. In the UK news, usage varied between vague reference (e.g. *some children, many children*) and generic reference (i.e. *children*)[21]. Vague/generic reference tends to make the readers assume that large sets of children, if not all children, are referred to and thus could suffer vaccine induced adverse effect. This is a typical example of risk amplification[9], and it was found that much of the amplification actually stemmed from Wakefield and colleagues' research article[29]. In contrast, the Australian newspapers often employed *our children*, especially in discussions of low immunization uptake[30]. The difference here is two-fold: the use of children is in relation to the positive effects of immunization, and there is also an implication of "social ownership" of children, which is related to the notion that immunization does not only benefit the individual child, but also society as a whole and in particular people with underlying medical conditions.

In terms of factuality, quantification featured prominently in both the UK and Australian media texts. Twenty-five percent of the Australian newspapers included statistics on disease morbidity and mortality in addition to current immunization rates. This type of reporting was also found in the later UK texts, while the earlier ones contained comparatively little quantification. This difference is due to the evolution of the MMR debate and its effect on vaccine uptake. So while the earlier texts only needed to report on the research that suggested an association to autism, the later articles had to include the same type of statistics as the Australian papers. Western societies can be divided into small and highly specialized epistemic communities where numerical manipulation is at the very core (e.g. medicine), versus the much larger non-specialized communities. In this context, we should point out that it is a misconception that scientific texts include more numerals than non-scientific texts. The distinction is actually qualitative rather than quantitative, as the scientific numerals are markedly more specific and exact[21]. Quantification is a much favored rhetorical device in media[37], presumably because of the association of authority with the specialized groups, but possibly also due to much of the non-specialized having limited numerical knowledge.

Internet

The use and reliance on information located on the internet has increased substantially since its inception and continues to increase. A recent study on HPV vaccination showed that 65% of the public use the internet to find out more about the virus and the vaccine, and media use also predicted vaccine uptake[38]. Part of its popularity is due to the allowance of, or even reliance on, interactivity between the writers/publishers and their audience. Skea and colleagues[39] analyzed discussions around the MMR vaccine posted on the British online forum Mumsnet, which is run by mothers for mothers (and fathers). Non-profit health websites like this one usually score high on interactivity measures, such as Complexity of Choice, Monitoring of Information, Responsiveness, and Interpersonal Communication[40]. Most of the parents on Mumsnet were in favor of immunization. The authors' analysis focused particularly on discussions about how to protect one's child as well as other children by vaccinating the child, and when it would be acceptable not to vaccinate.

We compared government-run versus parent-run websites with a strong focus on vaccines (especially the MMR vaccine) in 2009. The government websites Immunisation (immunisation.dh.gov.uk) and NHS choices (www.nhs.uk) were set up to provide easily accessible information about a range of vaccines, the diseases they protect against and any side effects they might cause, in order to ensure that parents can make an informed choice. Government health websites tend to score high on interactivity measures, except for Interpersonal Communication[40]. The parent-run websites JABS (www.jabs.org.uk) and Informed Parent (www.informedparent.co.uk) took a critical stance to vaccines, especially the MMR vaccine, arguing full disclosure of vaccine-damages. In terms of interactivity, JABS and Informed Parent was more similar to Immunisation and NHS choices than Mumsnet.

The language on all four immunization websites was very specialized, including terms specific to vaccines and diseases or related to the body and the immune system. Keyword analysis[41] confirmed the prominent position of the MMR vaccine and its potential link with autism in UK society. In fact, the only website that did not feature *autism* as a top-30 keyword was NHS choices (34th place). Instead, NHS choices contained substantial information on swine flu and the swine flu vaccine, and consequently terms like *anti-virals*, *complications* and *pregnant* featured more prominently as keywords. The parent-run websites included the keywords *adverse* and *reaction*, and Informed Parent also featured *homeopathy* and *Wakefield*, while the government-run ones focused on *symptoms* and *infection*. These patterns were also visible in the cluster analysis[41] carried out. In other words, dread words such as *autism*, *complications* and *adverse* featured on both types of websites, but more prominently on the lay websites.

Cluster analysis also revealed for the government websites a very strong focus on the immune system (e.g. *antibodies that will fight*) along with advice on when immunization is or is not recommended (e.g. *is usually given, reasons for not giving*). Immunisation and NHS choices relied largely on an educational and factual approach; that is, facts about diseases, vaccines, risk and the human body are presented and explained, and the tone is neutral. Much of the discourse was explicitly directed at parents (e.g. *your questions, your child, your doctor/GP*), although on NHS choices this was occasionally accomplished through the pronoun *I* (e.g. *what should I do, can I*). This kind of mixture of *you* and *I* was prominently utilized on JABS. Cluster analysis on JABS revealed a concern with evidence and anecdotes (e.g. *have been reported* and *known to be*) and the clusters *the Department of Health* and *Centers for Disease Control*. Overall, the two types of immunization websites differed considerably. The professional websites deliberated on the need to immunize from the point of view of the risk associated with the childhood diseases, whereas the lay websites were more concerned with reports on the risks of the vaccines and alternative approaches to immunization.

On Mumsnet, discussions centered particularly around the concept "herd immunity"[39]. Lay understanding of this concept involved a critical distinction between healthy and vulnerable children. Some members of the forum criticized parents who did not immunize their healthy children, thus standing in stark contrast to the vaccine-critical parents running JABS and Informed Parent. This sub-group argued that in terms of social responsibility and herd immunity, only vulnerable children should be allowed to opt out of the MMR vaccine, with a consensus

that *vulnerable children* referred to 'children who could not be vaccinated for medical reasons; children who were too young to be vaccinated; and the unborn children of unvaccinated pregnant women'.[39] Aside from *healthy* and *vulnerable*, Skea and colleagues[39] did not explore the terminology use in further depth. They did, however, explore what factors contributed to parents' deciding for or against the MMR vaccine. These include past experiences and beliefs about reactions to vaccines, autism, measles, mumps, rubella, and importantly, parents' assessment of their child as healthy or vulnerable (this assessment was often based on instincts).

Reframing and rephrasing the immunization message

Currently, there is an insufficient uptake of the MMR vaccine[42] and a strikingly low uptake of the annual flu vaccine in risk groups[43], not just in the UK but also overseas. A recent systematic review of interventions for reducing parental vaccine refusal and vaccine hesitancy was unable to determine evidence of effective immunization interventions, stressing the need for further investigation[44].

Studies have looked at the effects that media reports can have. What enabled the MMR debate to have such an extreme and long-term effect was the scientific dispute between Wakefield (and some colleagues) and the rest of the medical community. This dispute originally fueled the balance of pro- and anti-MMR evidence, anecdotes and quotes in media, but even now that Wakefield's claims have been retracted, media is still portraying a fairly balanced view (on the effects of falsely balanced MMR news reports, see Dixon et al[45]). At this point it is important to acknowledge that while media might strive (and claim) to be neutral, their sensationalizing of health risks and emphasizing of potential (but implausible) negative side-effects and the effect that this type of reporting has on the general public, renders them far from neutral[2]. Mason and Donnelly[46] discussed how a protracted campaign run by a local newspaper in Wales coincided with a greater decline of the MMR vaccine in this area. This news coverage most likely played a key role in the measles epidemic in Wales in 2012-2013. Similarly, Kata[24] has commented on the abundance of misinformation prevalent on the internet. In a recent study of how internet mediated immunization information can affect risk perception and intention to vaccinate, 325 participants (most of which were female) were exposed to websites manipulated for information on risk[47].The results showed that accessing websites critical of vaccines has a profound negative effect. Thus, the internet has great potential in making available health information to the general public and enhancing people's capacity of managing their own healthcare, if the message can be adequately structure in terms of both content and language[48].

Websites such as Immunisation and NHS choice constitute good examples of how the UK government has chosen this relatively new medium to address the issue of low immunization uptake. Investigation of these websites showed a preference for fact-oriented dissemination that is aimed directly at parents. Their predominant focus is on vaccines, how vaccines mimic the immune-system and the risks of vaccines. Previous studies[12] have shown that mothers have a strong desire to protect their child against communicable diseases. The Mumsnet study presented here found a sub-group of parents who stressed social responsibility and herd immunity. Their argument is very reminiscent of the implied social ownership of children in the pro-immunization Australian news. Immunization campaigns could prove more successful were they reframed as disease prevention campaigns aimed to protect both healthy and vulnerable children (i.e. protect healthy children with vaccines and vulnerable children

through herd immunity). In terms of rhetoric, this review shows that use of vague and generic reference could enhance further the implication that any and all children are in danger from vaccine-preventable diseases. We have seen how this type of language has been used to imply that all children are at risk from adverse vaccination effects in the UK, while in Australia similar constructions was used to highlight how immunization benefits everyone. Our suggestion is to utilize this rhetorical construction not in the context of immunization, but of the diseases, although it could be argued that there are some parents who feel that their child is special, with *special* not necessarily referring to children with underlying health conditions, and who may distance themselves from such a rhetorical construction.

On lay websites, parent stories are typically presented and compared with scientific studies, blurring the border between evidence and anecdotes. Due to the vaccine critical stance of JABS and Informed Parent, their parent material focuses predominantly on vaccine damage and how to get help and recognition for that damage. However, it must also be noted that scientific studies and reports form a significant part of the website, as these are frequently reproduced, quoted, linked to and discussed. This quasi-scientific atmosphere is, on the other hand, absent from internet forums like Mumsnet. Even so, parent stories dominate here and people have the opportunity to express their opinions, seek support and exchange information in a friendly and non-judgmental environment, although strong criticism does occur as in the case of the 'herd immunity' sub-group. Similarly, parent stories are often utilized in the news, where they bestow authenticity and generate empathy. The less specific a story is with regard to the identity of the people in it, the greater its persuasive power; that is, the more generic the story is, the more likely people will identify with the story[49]. The MMR debate in the UK news was largely fuelled by parents' vaccine-damage stories. Anecdotes can feel more real, due to the personal feeling of them and the fact that the parent(s) retelling them publicly vouch for them, whereas scientific evidence is remote, impersonal, generic and the person(s) behind them is typically faceless.

However, parent stories can be used to different ends; in the Australian news, the pro-immunization atmosphere largely stemmed from the inclusion of stories about children affected by vaccine-preventable diseases. Currently on Immunisation and NHS choice, parents feature in the role of information receivers, but not as information providers. Thus, while there are facts on vaccine-preventable diseases, there are no parent stories of children affected by these diseases. Immunization campaigns seem to presume that once parents have been given all the facts, and the vaccine myths have been laid to rest, parent will agree that immunization is the best option for their child. In order to improve vaccine uptake rates, immunization campaigns need adopt a lay-based/lay-oriented dissemination approach; that is, they need to ensure that their facts are backed up by parent stories, told by identifiable parents.

With regards to dread words, the first thing to note is that for the topic immunization there are a great many words that have negative associations and can cause dread to the general public. One way of lessening their effect is naturally to decrease their use; however, this could potentially cause severe problems in that parents may feel that side-effects (and the potential risk of autism in the case of the MMR vaccine) are not sufficiently dealt with. A better alternative is to look for synonymous and equally informative expressions. For example, expressions such as *complications, side-effects* and *adverse events* all have inherent negative associations. In addition, these terms

actually constitute vague and generic reference, where the concerned parent could misunderstand the terms to mean any and all possible side-effects. Words such as *swelling* and *rash*, on the other hand, are specific and stand for very common and above all naturally occurring phenomena and as such have less negative associations[50].

By reviewing recent studies of vaccine discourse in media and on the internet, this paper has detailed some striking differences both for content and for rhetoric that potentially impact parents' risk perception and ultimately vaccine uptake. We have also highlighted how some rhetorical constructions could be better utilized, how dread words should be handled with caution and where possible less negative alternatives could be better used. However, in order to provide tailored, high-quality communication strategies, we first need to establish what linguistic practices are already in place, by whom and to what effect, through further large-scale micro-analytic studies of public health messages beyond the MMR debate.

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